



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,710	05/20/2005	Volker Maywald	5000-0124PUS1	7546
2292	7590	08/02/2006	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			WITHERSPOON, SIKARL A	
			ART UNIT	PAPER NUMBER
			1621	

DATE MAILED: 08/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/535,710		MAYWALD ET AL.	
	Examiner		Art Unit	
	Sikar A. Witherspoon		1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The examiner has considered applicants' amendment and response filed June 7, 2006. The amendment was sufficient to overcome the rejection under 35 U.S.C. 112, second paragraph; however, the arguments with regard to the rejection under 35 U.S.C. 103(a) were not found persuasive, and as such, the following rejection has been maintained and rewritten to include newly added claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Curtze et al (US 5,945,567) and further in view of Rose et al (US 6,576,595) and Rains et al (US 5,476,970).

The instant claims are drawn to a process for preparing benzophenones (formula I) by reacting an acid chloride (formula II) with 3,4,5-trimethoxytoluene in the presence of an aromatic hydrocarbon selected from chlorobenzene, benzonitrile, and nitrobenzene, as solvent, from 0.01 to 2 mol% of an iron catalyst, and at a temperature between 60° C and the boiling point of the particular solvent. Further limitations include hydrochloric acid formed during the reaction being removed by stripping with an inert gas, distilling the diluent after the reaction and crystallizing the product in an alcohol,

Art Unit: 1621

preparing the acid chloride (formula II) by reacting an acid (formula III) with thionyl chloride or phosgene, and preparing the acid (formula III) by brominating an acid of formula IV.

Curtze et al teach a process for preparing 6,6'-dimethyl-2,2',3',4'-tetramethoxy-benzophenone by first, producing a benzoic acid that is subsequently reacted with thionyl chloride to produce the *corresponding* benzoyl chloride; reacting the benzoyl chloride with 3,4,5-trimethoxytoluene in dichloromethane, in the presence of aluminum chloride. The organic phase is concentrated and then recrystallized with methanol (col. 11, lines 35-60).

The differences between Curtze et al and the instant claims are that Curtze et al do not provide an example where an iron catalyst is used, do not teach the exact compound being made, do not teach the same diluent (solvent being used), and do not teach removing the hydrochloric acid produced from the process by stripping with an inert gas.

With regard to the first difference, while Curtze et al do not recite an example of their process wherein an iron catalyst is employed, the reference clearly teaches the preferred Friedel-Crafts catalyst is iron (III) chloride employed at a molar ratio of 0.001 to 0.2 mol, at a temperature from 50 to 180° C (col. 6, lines 35-47).

The examiner finds the fact that the exact compound is not being made immaterial and the instant claims obvious, since it would have been obvious to a person of ordinary skill that the *acylation* process taught by Curtze et al would have been

Art Unit: 1621

effective in producing the corresponding benzophenone regardless of the substituents present on the reacting compounds.

While Curtze et al do not expressly teach the same diluent(s) that may be employed in their process as those employed by applicants, Rose et al teach that in acylation reactions wherein an substituted benzene is reacted with an aromatic acid halide, suitable solvents include aliphatic hydrocarbons, and aromatic hydrocarbons, such as nitrobenzene and chlorobenzene, and halogenated hydrocarbons such as dichloromethane (col. 2, lines 28-35).

It therefore would have been obvious to a person of ordinary skill in the art, at the time the present invention was made, to employ such solvents as dichloromethane, nitrobenzene, chlorobenzene, methylene chloride, etc., i.e., solvents known to be useful in such processes, since Rose et al teach the equivalence of such solvents in acylation reactions.

Regarding final difference listed by the examiner, Curtze et al does not expressly teach how any hydrochloric acid produced by the acylation reaction is removed. However, Rains et al also teach the production of benzophenones by acylating a benzene compound with benzoyl chloride, and further, Rains et al teach that the hydrochloric acid produced is removed by venting from a gas release valve on reactor. This method of removal is different from the stripping step claimed in the instant process; however, the examiner takes the position that since Rains et al recognize that hydrochloric acid is produced and is present in the reaction effluent, and discloses a method for its removal, it would have been obvious for a person of ordinary skill in the

Art Unit: 1621

art, in light of the combined reference teachings, to remove any hydrochloric acid produced by removing gases from reaction effluents. The method of removing gases by stripping with an inert gas is well known in the art and can be accomplished with gases such as nitrogen and carbon monoxide.

Response to Arguments

Applicant's arguments filed June 7, 2006 have been fully considered but they are not persuasive. The thrust of applicants' arguments are that Curtze (the primary reference) does not teach the specific aromatic solvents recited in the instant claims, that there is not motivation provided by Curtze to select the specific range of iron catalyst required by the present claims, and that the combination of solvent and amount of iron catalyst affords applicants with unexpected advantages over the prior art.

Regarding the solvent, the examiner stated in the rejection that Curtze does not teach the solvents recited in the instant claims; however, as also stated in the rejection, Rose teaches, albeit for preparation of a different product, that solvents such as chlorobenzene and nitrobenzene can be employed in process wherein an aromatic compound is acylated with an acid or acid halide. The examiner therefore takes the position, as stated in the rejection, that one of ordinary skill would have been motivated to employ one of such solvents taught by Rose by the desire to choose from a broader class of aromatic hydrocarbons (Curtze teaches benzene as example of an aromatic hydrocarbon) that may be employed in such acylation reactions.

Art Unit: 1621

Regarding the amount of iron catalyst, the examiner finds applicants' contention that Curtze does not teach one example using an iron catalyst immaterial. Curtze clearly teaches at column 6, lines 45-47 that iron(III) chloride in a molar ratio of 0.001 to 0.2 is the preferred catalyst. While the range is broad, and the reference does not expressly teach applicants' specific range, the examiner contends that applicants' range is within such a range that a person having ordinary skill in the art would select or employ in attempting to use a minimal amount of catalyst that would afford optimal results, i.e., in the form of conversion, selectivity, yield, etc.; such an endeavor would undoubtedly be practiced by any person having ordinary skill in the art in order to keep process effective and yet cost efficient in terms of utilization of the catalyst.

The examiner contends that applicants cannot take examples from the cited references, compare them with their own examples (in the specification), and assert unexpected results. The examiner suggests that applicants submit a side-by-side comparison, in declaration form (comparing the closest prior art), if they would like to assert unexpected results. The dependent claim limitations that were not addressed by the examiner were not addressed because in and of themselves, they do not confer patentability to the invention as a whole. The examiner contends that a prima facie case of obviousness has been properly made.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 1621

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

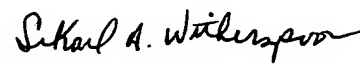
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sikarl A. Witherspoon whose telephone number is 571-272-0649. The examiner can normally be reached on M-F 8:30-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thurman Page can be reached on 571-272-0602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1621

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

saw


SIKARL A. WITHERSPOON
PRIMARY EXAMINER